Docket No: ATT/2003-0176
S/N: 10/750,448
Filed: Dec. 31, 2003

(11) (A) No. 1093858

(45) ISSUED 810120

(52) CLASS 73-69
C.R. CL. 88-97; 325-1

(51) INT. CL.[2] G01N 21/00

(19) (CA) **CANADIAN PATENT** (12)

(54) FIBRE OPTIC CABLE SIGNAL DETECTOR AND FAULT LOCATOR

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(21) APPLICATION No. 343,763

(22) FILED 800116

No. OF CLAIMS 7

This invention relates to fibre optics and more particularly to a device which enables the optical signal conducted by the fibre to be measured by a pressure or heat sensor.

The principle and putting into practice of signal transmission along a fibre, usually a quartz fibre, by modulation of light is well known. A major advantage of fibre light transmission is the high bandwidth, typically 200 MHz, obtained versus the 10 MHz normal with metal coaxial cable. Optical fibres also differ from their conventional communication counterparts in that the fibre is entirely an insulator rather than a conductor. Furthermore since the light signal travels within the fibre, always reflecting inwards when it strikes the fibre outer boundary there is no light emitted from the fibre and hence no signal along its length except at the very end. Since the fibre is generally covered in a mechanically protective, opaque sheath there is even less likelihood that light will escape. Because, of this fibre optic cables are said to be very private since there is no analogy with inductive coupling which may be used with metal cable in order to intercept messages being transmitted along it. This privacy also makes it difficult to locate the exact position of breaks in the optical fibre within the cable sheath.

To a lesser extent break detection is also a problem in metal communication lines though here the possibility of visual inspection exists, at least for bare twisted-pair lines. One common solution is time domain reflectometry whereby an electrical pulse is sent down the line and its reflection monitored. The reflected pulse will indicate the presence of breaks or discontinuities. This method may also be employed with optical fibres, however, a disadvantage in both cases is that intricate, expensive equipment is needed particularly if the break or discontinuity is to be located precisely within a fraction of a centimetre.

We propose a new solution to the problem of the interception of modulated light signals and the location of defects, bends or ruptures in fibre optical cables. Our solution arises from consideration of the optoacoustic cell (some synonyms are: spectrophone, photoacoustic cell etc.) which essentially measures heat or pressure generated by the passage of light through a medium

Figure 1 is a plan view of the Fibre Optic Cable Signal Detector. Item 1 is a fibre optic cable to which glue is joined (2). Also joined to the glue is a piezoceramic transducer (3).

Figure 2 is an edge view of the same device.

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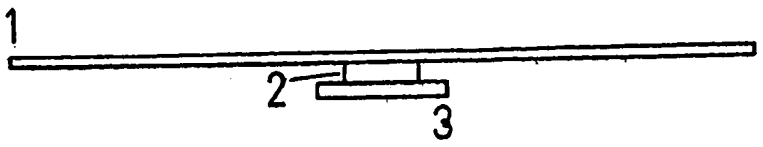

FIGURE 1

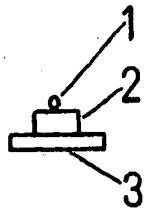

FIGURE 2

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